IN THE CLAIMS:

1. (Original) A breath gas analyzer having a pump configured to draw a flow of air through a capnograph adapted to identify a transition point between an exhalation and an inhalation, and to subsequently direct said flow of air through at least one gas analyzer, comprising:

a first flow selector valve disposed downstream from said capnograph, said first flow selector valve configured to selectively divert said flow of air through a sample volume to said pump and to divert a bypass flow of air past said sample volume to said pump;

a second flow selector valve disposed downstream from said first flow selector valve, said second flow selector valve configured to isolate said sample volume from said first flow selector valve;

a third flow selector valve disposed downstream from said second flow selector valve, said third flow selector valve configured to receive said bypass flow of air from said first flow selector valve and to isolate said sample volume from said pump;

a fourth flow selector valve disposed downstream from said pump, said fourth flow selector valve configured to selectively exhaust said flow of air and to route said flow of air into said isolated sample volume; and

wherein said second flow selector valve is further configured to selectively exhaust said sample volume through the at least one gas analyzer.

2. (Original) The breath gas analyzer of Claim 1 wherein said second flow selector valve and said third flow selector valve are responsive to signals from said

capnograph to isolate said sample volume from said first flow selector valve and from said pump.

3. (Original) The breath gas analyzer of Claim 1 wherein said fourth flow selector valve is responsive to signals from said capnograph to route said flow of air into said isolated sample volume.

4. (Original) The breath gas analyzer of Claim 3 wherein said fourth flow selector valve is responsive to signals from said capnograph to route said flow of air through a one-way valve into said isolated sample volume.

5. (Original) The breath gas analyzer of Claim 1 wherein said second flow selector valve is responsive to signals from said capnograph to exhaust said sample volume through the at least one gas analyzer.

6. (Original) The breath gas analyzer of Claim 1 wherein the at least one gas analyzer includes a CO gas analyzer.

7. (Original) The breath gas analyzer of Claim 1 wherein the at least one gas analyzer includes an O_2 gas analyzer.

8. (Original) The breath gas analyzer of Claim 1 further including a microprocessor configured to receive signals from said capnograph and to control operation of each of said flow selector valves.

9. (Original) A method for capturing and analyzing the end-tidal portion of an exhalation, including the steps of:

drawing a flow of air from the breath of a patient;

monitoring the CO_2 level of said flow of air;

identifying a point of transition between an increasing CO_2 level and a decreasing CO_2 in said flow of air, said point of transition representative of a change from exhalation to inhalation in the breath of said patient;

upon identification of said transition point, isolating a sample volume of said flow of air drawn prior to said transition point;

diverting a continued flow of air past said sample volume;

monitoring the CO_2 level of said continued flow of air to confirm said change from exhalation to inhalation in the breath of said patient;

measuring, upon confirmation of said change from exhalation to inhalation in the breath of said patient, at least one gas level in said isolated sample volume.

10. (Original) The method of Claim 9 for capturing and analyzing the end-tidal portion of an exhalation wherein the step of measuring includes measuring the CO level in said isolated sample volume.

11. (Original) The method of Claim 9 for capturing and analyzing the end-tidal portion of an exhalation wherein the step of measuring includes measuring the O_2 level in said isolated sample volume.

12. (Original) The method of Claim 9 for capturing and analyzing the end-tidal portion of an exhalation further including the step of exhausting said measured sample volume.

13. (Original) The method of Claim 9 for capturing and analyzing the end-tidal portion of an exhalation further including the step of diverting said continued flow of air into said isolated sample volume prior to said measuring step, said diverted

continued flow of air displacing said isolated sample volume air through at least one gas measurement component.

14. (Original) A breath gas analyzer system including:

an air inlet configured to receive aspirated air from the respiratory system of a subject;

a capnograph coupled to said air inlet, said capnograph adapted to identify a transition point between an exhalation and an inhalation of air in the respiratory system;

a sample volume coupled to said capnograph, said sample volume configured to selectively isolate a sample of aspirated air; and

at least one gas analyzer configured to receive a sample of aspirated air from said sample volume; and

wherein said at least one gas analyzer is further configured to measure at least one gas concentration in said sample of aspirated air.

15. (Original) The breath gas analyzer system of Claim 14 further including a pump, said pump configured to draw said aspirated air through said air inlet, said capnograph, and into said sample volume; and

wherein said pump is further configured to expel said sample of aspirated air from said sample volume, and through said at least one gas analyzer.

16. (Original) The breath gas analyzer system of Claim 14 further including a plurality of flow selector valves, said plurality of flow selector valves configured to selectively control a flow of air between said air intake, said capnograph, said sample volume, and said at least one gas analyzer.

17. (Original) The breath gas analyzer system of Claim 14 further including at least one exhaust port configured to discharge air; and

an airflow bypass pathway configured to selectively route an airflow from said capnograph to said exhaust port, bypassing said sample volume.

18. (Original) A method for capturing and analyzing the end-tidal portion of an exhalation, including the steps of:

drawing a flow of air from the respiratory system of patient;

identifying a point of transition representative of a change from exhalation to inhalation in the breath of said patient;

upon identification of said transition point, isolating a sample volume of said flow of air drawn prior to said transition point;

confirming said change from exhalation to inhalation in the breath of said patient;

measuring, upon confirmation of said change from exhalation to inhalation in the breath of said patient, at least one gas level in said isolated sample volume.

19. (Original) The method of Claim 18 for capturing and analyzing the end-tidal portion of an exhalation wherein the step of identifying a point of transition includes monitoring changes in a concentration of gas in of said flow of air to identify a point of transition.

20. (Original) The method of Claim 19 for capturing and analyzing the end-tidal portion of an exhalation wherein the step of identifying a point of transition includes monitoring changes in a concentration of CO_2 in of said flow of air, said point of transition corresponding to a transition from an increasing CO_2 level to a decreasing CO_2 level in said flow of air.

21. (Original) The method of Claim 18 for capturing and analyzing the end-tidal portion of an exhalation wherein said step of measuring includes measuring a CO concentration in said isolated sample volume.

22. (Original) A periodic gas pattern analyzer having a pump configured to draw a flow of gas through a detector, the detector adapted to identify a threshold level of a periodic element or component in the gas, and to subsequently direct the flow of gas through at least one gas analyzer, comprising:

a branching component disposed downstream from the detector, said branch component configured to direct the flow of gas through a sample volume to said pump and to through a bypass around said sample volume to said pump;

a first flow selector valve disposed downstream from said branching component, said first flow selector valve configured to isolate said sample volume from said branching component;

a second flow selector valve disposed downstream from said first flow selector valve, said second flow selector valve configured to receive said bypass flow of gas from said branching component and to isolate said sample volume from said pump;

a third flow selector valve disposed downstream from said pump, said third flow selector valve configured to selectively exhaust said flow of gas and to route said flow of gas into said isolated sample volume; and

wherein said first flow selector valve is further configured to selectively couple said sample volume to said at least one gas analyzer.

23. (Original) The periodic gas pattern analyzer of Claim 22 wherein said first flow selector valve and said second flow selector valve are responsive to signals from

said detector to isolate said sample volume from said branching component and from said pump.

24. (Original) The periodic gas pattern analyzer of Claim 22 wherein said third flow selector valve is responsive to signals from said detector to route said flow of gas into said isolated sample volume.

25. (Original) The periodic gas pattern analyzer of Claim 24 wherein said third flow selector valve is responsive to signals from said detector to route said flow of gas through a one-way valve into said isolated sample volume.

26. (Original) The periodic gas pattern analyzer of Claim 22 wherein said first flow selector valve is responsive to signals from said detector to couple said sample volume to the at least one gas analyzer.

27. (Original) The breath gas analyzer of Claim 22 further including a microprocessor configured to receive signals from said detector and to control operation of each of said flow selector valves responsive to said received signals.

28. (Original) A method for capturing and analyzing a portion of a time-varying gas pattern, including the steps of:

drawing a flow of gas from the time-varying gas pattern;

monitoring a level of a periodic element of said flow of gas;

identifying a transition in said flow of gas, said transition corresponding to said level of a periodic element reaching a predetermined threshold;

upon identification of said transition, isolating a sample volume of said flow of gas drawn prior to said transition point;

diverting a continued flow of gas past said sample volume;

monitoring the level of said periodic element of said continued flow of gas to confirm said transition;

measuring, upon confirmation of said transition, at least one gas level in said isolated sample volume.

29. (Original) The method of Claim 28 for capturing and analyzing a portion of a time-varying gas pattern further including the step of exhausting said measured sample volume.

30. (Original) The method of Claim 28 for capturing and analyzing a portion of a time-varying gas pattern further including the step of diverting said continued flow of gas into said isolated sample volume prior to said measuring step, said diverted continued flow of gas displacing said isolated sample volume gas through at least one gas measurement component.